



EFFECT OF DETERGENT ON DIRECT DYED COTTON FABRICS AND IT'S COLOURFASTNESS PROPERTIES

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ABSTRACT:

Cotton is the world's most used fiber. Cotton is a natural fiber and is used in a wide variety of clothing and home furnishings. It is a natural fiber that is obtained from cotton linters. The cotton is a relatively pure and inexpensive source of cellulose. Cotton has a combination of desirable properties, making it suitable for many uses. It has properties of low cost, low resiliency, launderability, and absorbency. The low cost is perhaps one factor that led to the wide use of cotton for textiles. Cotton is easily washed and dry-cleaned. Cotton is a good strong fabric that is absorbent, and easy to work with. Cotton's strength increases by approximately 25% when wet, which is important in washing and ironing. The strength of cotton is improved by treating it with caustic soda, the process called mercerization also increases its luster and affinity for dyes. This paper studied wash fastness properties on direct dyed cotton fabric. This work aimed to study the wash fastness of the dyes by washing them with popular detergents. The dyed cotton fabrics' color strength and wash fastness were evaluated and compared using the Greyscale method. The studies revealed that the dyeing property of the fabrics after washing with water and different detergents was very much affected. It can be concluded that the direct dyed fabrics have bad dyeing and wash-fastness properties.

Keywords:- Direct dyes, Good fastness, Light fastness, Wash fastness.

INTRODUCTION :

Apart from the cleaning properties of the detergents the other area of concern is the colour fastness, which is a term used in the dyeing of textile materials, meaning resistance of the material's colour to fading or running. Thus, the quality of a fabric is the function of colour fastness (for different dyes) and the reaction of detergents with the fabric and dyes (during the washing process). Detergents have been subject to constant improvements to increase their cleaning power, to better protect coloured clothing, and to have a lower environmental impact.

The endpoint for formulators for laundry detergents is consumer satisfaction. Thus, it is evident that the cleaning property of detergents as well as the nature of different dyes provides a dynamic situation that demands careful planning for the washing process for sustaining the quality of fabrics. Against the backdrop of the above information, this study was carried out to assess

the impact of different commercially available laundry detergents on color fastness of dyed cotton fabrics. The researcher was motivated to carry out research in this domain as it offers significant potential benefits through a closer understanding of the effectiveness of detergents, which are an essential commodity of human life. The specific objectives of the study were as under.

OBJECTIVES OF THE STUDY :

1. To standardize the dyeing procedure by using 100% branded cotton fabrics.
2. To observe the effect of color fading of the dyed fabric in the process of laundering.
3. To suggest the most effective laundry detergent based on its property of color fastness.

MATERIALS AND METHODS:

Selection of detergent:

Three different brands of detergents, Ariel (Ar), Tide(Td), and Wheel(Wh) were used in this study. These washing powders is manufactured and sold by the retail company. Each detergent is a

well-known detergent, available at most supermarkets and retail shops.

Experimental Fabrics :

100% Cotton (Poplin) fabric was used in this study. The fabric was scoured and subjected to drying.

Dyes :

For this study Direct dye, a) Blue Colour and b) Parrot Green Colour was selected.

Methods Followed:

The cotton fabrics were dyed in different colours, namely Direct dyes- Sky blue and Parrot Green color. In assessing the colorfastness of experimental fabrics for laundering, tests for colour change as well as staining are important (Merkel, 1991). Greyscale was used during laundering treatments to indicate its possible staining due to colour loss of experimental fabrics.

Colour fastness of dyed samples:

The final dyed samples were subjected to colour fastness tests. The tests conducted were. 1) Colour fastness to washing - related standard: ISO:105, BS: 1006:1990 2) Colour fastness to crocking related - standard: IS: 776:1988 and ISO: 105/X-1984 Grey Scale for assessing change in shade/colour : ISO 105-A02 Grey Scale for assessing Staining: ISO 105-A03

RESULT AND DISCUSSION :

• Fastness to washing Test Report : Direct dyed Blue and Green colour:

From the study results regarding the grayscale rating for change in colour shade (for direct blue and green dyed fabrics) concerning the selected detergents, it was observed that the total variation in the rating (for change in colour shade) was between 2 and 3, however, 98% samples indicated the rating to be 2. Furthermore, there was no variation in the colourfastness rating (grayscale rating for change in colour shade) concerning the setting temperature, which was set at room temperature, 40°C to 60°C. Hence, it may be concluded from

the study results that the direct blue-dyed cotton fabrics were poor colorfast.

• Fastness to Rubbing Test Results: (Dry Rubbing Fastness)

Information on dry rubbing fastness of cotton fabrics dyed with different dyes selected in the study. It was evident from the data that cotton fabric dyed with direct dye blue and direct dye parrot green showed a rating of 4.17 for dry rubbing fastness

• Wet Rubbing Fastness:

Information about wet rubbing fastness of cotton fabrics dyed with different dyes selected in the study. It was apparent from the information that cotton fabric dyed with direct dye blue and direct dye parrot green showed a rating of 4.33 for wet rubbing fastness.

• Colour Fastness to Light:

Information regarding colour fastness to light test of cotton fabric dyed with different dyes selected in the study. It was observed that cotton fabric dyed with direct dye blue and Parrot green colour indicated ratings of 2.47 and 1.80 respectively for colour fastness to light test.

CONCLUSION:

The study results about grayscale rating for change in colour shade to the selected detergents, it can be concluded that the direct blue dyed cotton fabrics are poor colorfast. Based on dry rubbing fastness, wet rubbing fastness, and colour fastness to light study results it can be concluded that Direct dyed blue and parrot green colour are poor colourfastness properties.

REFERENCES:

- Daniela C., Vilarem, G., Improving light fastness of natural dyes on cotton yarn. Dyes and Pigments, 70(3), 2006. p. 238-245.
- Cameron B. A., Laundering in Cold Water: Detergent Considerations for Consumers, Family and Consumer Sciences Research Journal, 2007; 36; 151.

Card A., Moore M. A., Ankeny M., Garment washed jeans: impact of launderings on physical properties, 2006, 18(1): 43-52.

Chavan R. B., Vhanbatte S., Alternative reducing system for dyeing of cotton with sulphur dyes, Indian Journal of Fibre and Textile Research, Vol. 27, 2002:179-183.

Chinta P.S. and Dhar S, Problems in dyeing and their remedies.

Parma M.S., Sharma R.P., Development of various colours and shades in naturally

coloured cotton fabrics, Indian Journal of Fibre and Textile Research, (2002), 27: 397-407.

Padole H, Nasre M, The Impact of Different Laundry Detergents on Stain Removal and Colour Fastness of Dyed Cotton Fabrics, Ph.D. Thesis Submitted at RTM Nagpur University, Nagpur, 17 August 2013.

